A Preliminary Observation on the Food and Feeding Habits of some Collembola

By S. B. Singh

(Department of Zoology (Bihar University), L. S. College, Muzaffarpur, Bihar, India)

Macnamara[1], whose view on the relationship between the nature of mandibles and feeding habits of the Collembola is held widely, regarded that the forms having mandibles provided with well developed molar plates use these for chewing and were vegetarian in nature while those without molar plates were suctorial and carnivorous. The observations of the present worker do not support this view in its entirety.

The mouthparts, food and feeding habits of four species of springtails were studied. *Tomocerus longicornis* (Müller) and *Onychiurus armatus* (Tullberg) possess stout mandibles with well developed molar plates, *Friesea mirabilis* (Tullberg) has mandibles without molar plates and the mouthparts of *Neanura muscorum* (Templeton) are reduced to stylet-like form. The natural food of these insects was ascertained by examination of the gut contents, by preparing squashes and smears, by using culture media to determine the nature of micro-organisms in these and with the help of paraffin sections. These showed that *T. longicornis* and *O. armatus*, with well developed molar plates, take solid food and are largely mycetophagous. But in the laboratory as well as in nature occasionally they have been found ingesting their own exuviae, and at one instance, both these species have been seen feeding upon aphids. Macnamara himself observed *Isotoma sepulcralis*, with well developed molar plates, feeding upon some animal food.

N. muscorum with stylet-like mandibles feeds upon fine particles, such as bacteria and fungal spores suspended in liquid media and *F. mirabilis* without molar plates feeds upon soft animal tissues but can also ingest fluid food. Attempts were made to carry out experimental feeding with these forms. Neither showed any preference for animal food. The former showed no inclination towards living, dead or partially amputated animals, and was never found in association with these. The exact food of *F. mirabilis* was difficult to determine as it did not show any interest in dead or living animals either, and there is strong evidence that this species is necrophagous. Its gut contains a viscous, jelly-like fluid of a cellular nature and in the collembolan breeding season, it is often full of collembolan eggs embedded in a matrix resembling partially digested animal tissues and staining deep blue with Mallory's triple and Haematoxylin stains. The

[1]Macnamara, C. (1924). The food of Collembola. *Canad. Ent.*, **56**: 99-105.

number of eggs in the gut was so large that they could not have been ingested individually; while their being embedded in a matrix suggests that a collembolan with mature ovaries had been eaten. Now since in the laboratory *F. mirabilis* was never found to be predatory not its habit and constitution suggest a predatory habit, the only likelihood is that it is necrophagous.

Hence in modification of Macnamara's view, it may be stated that Collembola with well developed mandibular molar plates are solid food feeders but not necessarily vegetarian and those devoid of it are primarily fluid feeders but not essentially carnivorous although some of the latter type may ingest animal tissue, usually if it is sufficiently decayed and liquified and thus fit to be sucked in.

The author is grateful to Professor B. M. Jones, Department of Zoology, University of Wales, Aberystwyth, U.K., for encouragement and for providing necessary laboratory facilities; to Dr. T. B. Poole for supervision, and to Dr. U. S. Srivastava, Professor and Head of the Department of Zoology, Bihar University, for help in the preparation of the manuscript.